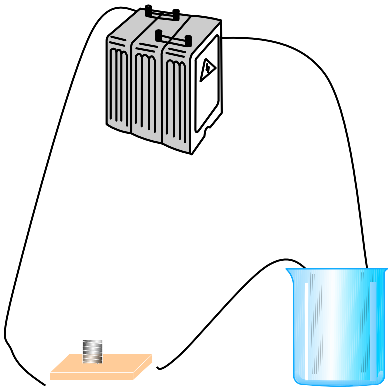
[illegible]

water

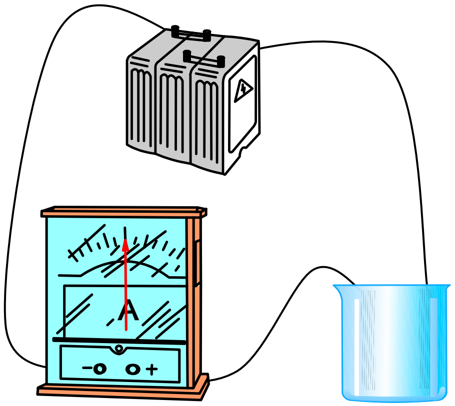
H_2O

[illegible]

[illegible] H^+ [illegible] OH^- [illegible]



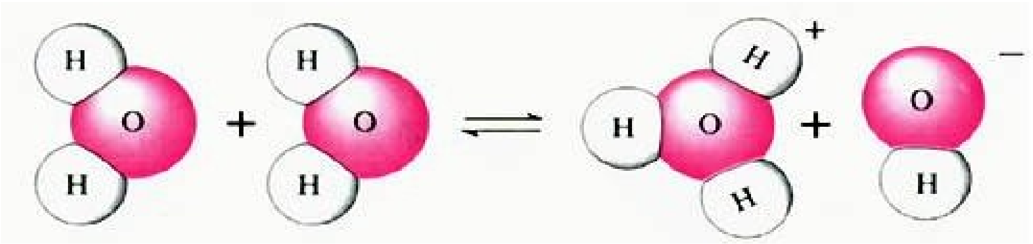
I



II

[illegible]	I	II
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	

□□□□□□



1. □□□□□□□

$H_2O + H_2O \rightleftharpoons H_3O^+ + OH^□$

□□□□ $H_2O \rightleftharpoons H^+ + OH^□$

(□□□□□ H□□ OH□□□□□)

□□□□□□□□

25℃
□□ 1L □ 55.6mol □□□□
□ 10^{-7}mol H_2O □□□□□
□□

2 [illegible]

$$H_2O \rightleftharpoons H^+ + OH^-$$

$$K = \frac{c(H^+) \times c(OH^-)}{c(H_2O)}$$

$$\Rightarrow K \cdot c(H_2O) = c(H^+) \cdot c(OH^-)$$

$$Kw = c(H^+) \cdot c(OH^-)$$

Kw —— [illegible]

① [illegible] 25°C [illegible]

$c(H^+)=c(OH^-)=10^{-7}mol/L$

$K_W = c(H^+) \cdot c(OH^-) = 1.0\times 10^{-14}$

② K_w [illegible]

[illegible]

③ [illegible] K_w [illegible]

◆ K_w [illegible] Why?

[illegible]	0°C	20°C	25°C	50°C	100°C
K_W	1.34×10^{-15}	6.81×10^{-15}	1.01×10^{-14}	5.47×10^{-14}	5.5×10^{-13}

$H_2O \rightleftharpoons H^+ + $ [illegible] OH^-

[illegible]______[illegible] [illegible]

$c(H^+)$ [illegible] ________, $c(OH^-)$ [illegible] ________, [illegible] K_w

____

[illegible] H^+ [illegible] $10^{-6.5}$ mol/L [illegible]

______25°C([illegible]"[illegible]""[illegible]""[illegible]")

3 [illegible]

$$H_2O \rightleftharpoons H^+ + OH^-$$

[illegible]

[illegible]	[illegible]	$c(H^+)$	$c(OH^-)$	K_w
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] HCl	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] NaOH	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] Na	[illegible]	[illegible]	[illegible]	[illegible]

① [illegible] K_w [illegible]

② [illegible] K_w [illegible]

③ [illegible]

[illegible]

1 [illegible]

[illegible]

[illegible] $c(H^+)$ [illegible] $c(OH^-)$ [illegible] $K_W = c(H^+)\cdot c(OH^-)$

Kw [illegible] $c(H^+)$ [illegible] $c(OH^-)$ [illegible] **Kw** [illegible]

[illegible]

2 [illegible] $c(H^+)$ [illegible] $c(OH^-)$ [illegible]

[illegible]

[illegible] **H** [illegible] **OH** [illegible]

[illegible]

□□□□□□□□□□□□□□

1. 0.1mol/L □□□□□□□

$c(H^□)$□ 0.1mol/L ________, $c(OH^-)$= 10^{-13}mol/L ________□

10^{-13}mol/L ________ 10^{-13}mol/L

2. 0.1mol/L NaOH □□□□ ________□ $c(H^□)_□$□ ________

□□□□□□ $c(OH^-)_□$□

$c(OH^-)$□ 0.1mol/L ________, $c(H^□)$= 10^{-13}mol/L ________

□ ________ 10^{-13}mol/L 10^{-13}mol/L

□□□□□□ $c(OH^-)$□ □ $c(H^□)$□

①. □□□□□□□ $C(H^+)_□=C(OH^-)_□$□ $K_W=c(H^+)\cdot c(OH^-)$

②. □□□□□□□□ H^+ □□□□□ OH^- □□□□□

□□□□□□□□□ H^+ □

□□□□□□□□ OH^- □□□□□ H^+ □□□□□

□□□□□□□□□ OH^- □

[illegible]

$c(H^+) = 1 \times 10^{-9}$ mol/L [illegible]

[illegible] pH [illegible] [illegible] $pH=-\lg c(H^+)$

[illegible]

① [illegible] $C(H^+)_{[illegible]} = C(OH^-)_{[illegible]}$ [illegible] $K_W = c(H^+) \cdot c(OH^-)$ ② [illegible] OH^- [illegible]

[illegible] H^+ [illegible]

[illegible] **p46** [illegible]

[illegible]

□□□□□□□□□□pH

1. □□□□□□□$c(H^{+})$□$c(OH^{□})$□□□

$c(H^{+})$ □ $c(OH^{□})$ □□

$c(H^{+})$ □ $c(OH^{□})$ □□

$c(H^{+})$ □ $c(OH^{□})$ □□

□□□□□□□□□□□□$c(H^{+})$□ $c(OH^{□})$□□□□□□□
□□

□□25°C□$c(H^{+})$ □

[illegible]

1 [illegible] $c(H^+)$ [illegible] $c(OH^-)$ [illegible] √

2 [illegible] √

3 [illegible] $c(H^+)/c(OH^-)$ [illegible] √

4 [illegible] $c(H^+)$ [illegible] $c(OH^-)$ [illegible] √

5 [illegible] $c(H^+)$ [illegible] $10^{-6}mol/L$ [illegible] ×

6 [illegible] ×

2. [illegible] pH [illegible]

① pH $pH=-\lg c(H^+)$

[illegible] H^+ [illegible] [illegible]

[illegible]

[illegible] $c(H^+)$ [illegible] $c(OH^-)$ < 1 mol/L [illegible]

pH [illegible] 0 ~ 14

② [illegible] **pH** [illegible] **25℃** [illegible]

[illegible] **$c(H^+)=1\times10^{-7}$mol/L** **pH =7**

[illegible] **$c(H^+)>1\times10^{-7}$mol/L** **pH [illegible] 7**

[illegible] **$c(H^+)<1\times10^{-7}$mol/L** **pH [illegible] 7**

[illegible] K_w =1.0× 10^{-12}, [illegible] pH [illegible]

③ [illegible]

a [illegible] **pH** [illegible] **pH**

[illegible] pH [illegible] [illegible] **1** [illegible] pH [illegible] 0.1 [illegible]

[illegible] **pH** [illegible] [illegible] **pH** [illegible]

b [illegible] **pH** [illegible] **pH** [illegible] **0.01** [illegible]

c [illegible]

[illegible]	[illegible] **pH**		
[illegible]	<5 [illegible]	5~8 [illegible]	>8 [illegible]
[illegible]	3.1< [illegible]	3.1~4.4 [illegible]	> 4.4 [illegible]
[illegible]	<8 [illegible]	8~10 [illegible]	> 10 [illegible]

□□□□□

1. □□□□□□□□□□□

①0.01mol/L □□□　② pH=3 □□□□□　③ NaCl □□

④0.1mol/L □□□□□□□　⑤ pH=12 □□□

□1□□□□ $c(H^+)$ □□□□□□□ ___①>②>③>⑤>④___

□2□□□□□□ $c(H^+)$ □□□□□□□ ___③>②>①=⑤>④___

2. □□□□□□□□□　□B

A. pH=7 □□□□□□□□

B. $c(H^+)=\sqrt{K_W}$ mol/L □□□□□□□□

C. □□□□□□□□□□□□ pH □□

D. □□□□□□□□□□□□□ pH □□

[illegible] **pH** [illegible]

[illegible]

pH [illegible] lg[H[illegible]] [illegible] Kw [illegible] [H[illegible]][OH[illegible]]

[H[illegible]] [illegible] 10[illegible] pH [illegible] [OH[illegible]]=10 pH [illegible] 14

1 [illegible]

[illegible] 1 [illegible]

[illegible] 0.01mol/L [illegible] HCl [illegible] pH [illegible] [illegible] H^+ [illegible]

[illegible] 2 [illegible]

[illegible] 0.001mol/L [illegible] NaOH [illegible] pH [illegible] [illegible] OH^- [illegible]

2 [illegible]

① [illegible]

[illegible] pH=1 [illegible] HCl [illegible] pH=3 [illegible] HCl [illegible]

pH=______ 1.3 [illegible] ([illegible] lg2=0.3 [illegible] lg5=0.7)

② [illegible]

[illegible] pH=9 [illegible] NaOH [illegible] pH=11 [illegible] NaOH [illegible]

[illegible] pH=______ 10.7

③ [illegible]

[illegible] pH=3 [illegible] HCl [illegible] pH=11 [illegible] NaOH [illegible]

[illegible] pH=______ 7

[illegible] 0.1mol/L [illegible] 0.06mol/L [illegible] $Ba(OH)_2$ [illegible]

[illegible] pH=______ 12

[illegible] pH=3 [illegible] HCl [illegible] pH=12 [illegible] NaOH [illegible]

______ 999:101 [illegible] pH=9 [illegible]

3 □□□□□

pH = 3 □ HCl □□□□ 10 □□ 10^5 □□□□□□□ pH □□□□□□□ pH = 3 □ CH_3COOH □□□□□ 10 □□ 10^5 □□□

a. □□□□□□□□□□□ 10 □□□□□ pH □□□□□□□□□ pH □□□□□□□□

b. □□□□□□□□□□□ 10 □□□□□ pH □□□□□□□□□□□ pH □□□□□□□□□□

c. □□□□□□□□□□□□□□ pH □□□□□□ 7

□□□□□□□□□□□□pH□□□

□1□□pH=2□HCl□□100□□□pH=___4____□

□pH=13□NaOH□□100□□□pH=__11___;

□2□□pH=5□HCl□□10^3□□□pH__□□□7__□

□pH=10□$NH_3 \cdot H_2O$□□1000□□□pH__□□□7__

2<pH<3

□3□□pH=2□CH_3COOH□□10□□□pH______

8<pH<10

□

□pH=10□$NH_3 \cdot H_2O$□□100□□□pH______

□□□□□

1. □pH=5□H_2SO_4□□□□1000□□□□□□SO_4^{2-}□□□□

H^+□□□□□□□□□　　　□　　　　**D**

A. 1:10　　　B.1:1　　　C.1:2　　　D.1:20

2. □□□□□pH□a□□□□pH□b□□□□□□□□□□□□□，

□□□□□□□□□□□□□(　　　)　　　　**A**

A□$10^{(a□b□12)}$□　　　B□$10^{(a□b□14)}$□

C□$10^{(12□a□b)}$□　　　D□$10^{(14□a□b)}$□

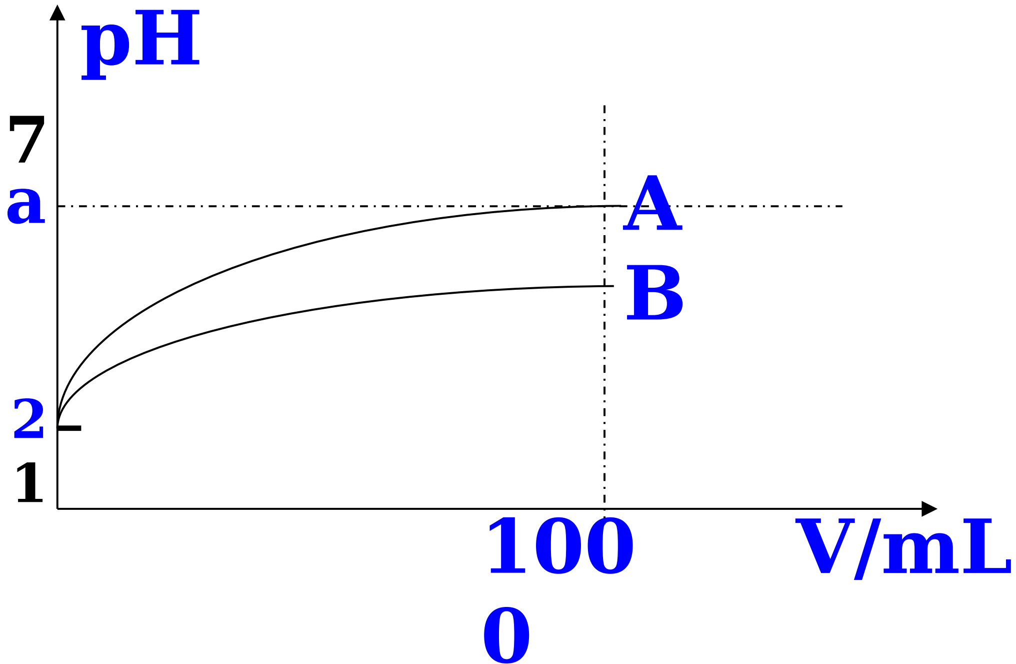
3. pH=2 □ A □ B □□□□□□ 1mL □□□□□□□
1000mL □□ pH □□□□□ V □□□□□□□□□□□□□□
(□□) □　　　　□　　　**C D**

A. A □ B □□□□□□□□□□□□□

B. □□□□ A □□□□□ B □□□

C. a=5 □□ A □□□□ B □□□

D. □ A □ B □□□□□ 5 □ a □ 2



4. □25℃□□□10□□□□□□□□□pH=a□□1□□□□□□□□

(pH=b)□□□□□□□□□□□□□□□□□□□pH□□□□□pH□□□□□

□□□□□ □

C

A□a□b□14　　　　B□a□b□13

C□a□b□15　　　　D□a□b□7

pH□□□□□

1. □□□□pH=2□HCl□□□pH=4□HCl□□□□□□□□

□□□□pH=______ □(□□lg2=0.3□lg5=0.7) **2.3**

2. □□□□pH=10□NaOH□□□pH=12□NaOH□□

□□□□□□□□□□pH=_____ 11.7

3. □□□□□□□□□□□H^+□□□$10^{-6.5}$mol/L, □□□□□□□□□□□

□□□□______ 25°C□□□□□□□□pH=11□NaOH□□ aL

□pH=1□H_2SO_4□□□ bL□□□

□1□□□□□□□□□□□□a:b=_______□ **10:1**

□2□□□□□□□□pH□2□□a:b=______□ **9:2**

□3□□□□□□□□pH□10□□a:b=_______□ **101:9**

[illegible]

1 [illegible]

$$n(H^+)_{[illegible]} = n(OH^-)$$

[illegible]

[illegible] P_{49} [illegible] **0.1032mol/L** [illegible] **NaOH** [illegible]

$$c(H^+)V_{[illegible]} = c(OH^-)V_{[illegible]}$$

$$c(OH^-) = \frac{c(H^+)V_{HCl}}{V_{NaOH}}$$

[illegible]—[illegible] **HCl** [illegible]

[illegible]—[illegible] **NaOH** [illegible]

$$c_{[illegible]} = \frac{c_{[illegible]}V_{[illegible]}}{V_{[illegible]}}$$

[illegible]

[illegible]

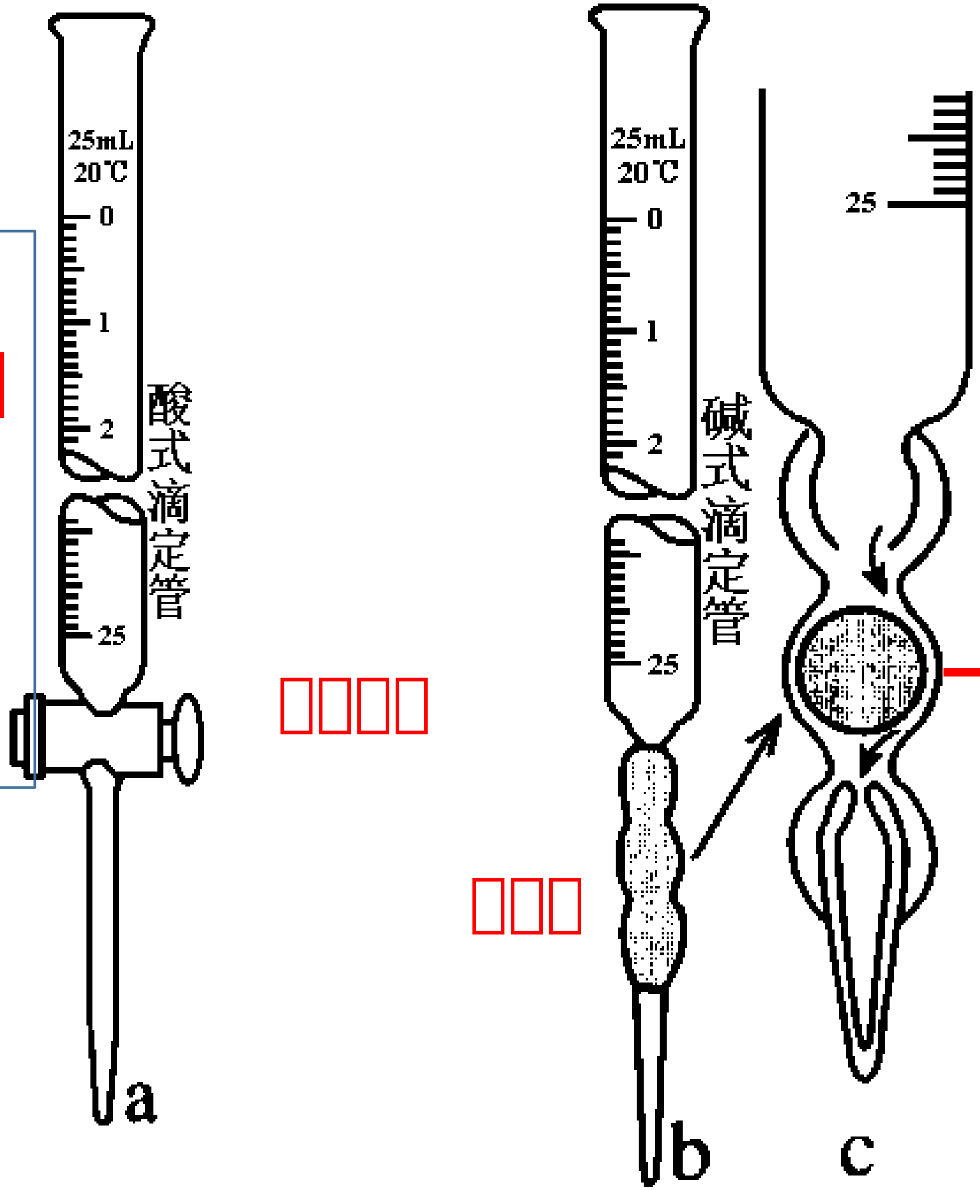
①“0” [illegible]

[illegible] 0 [illegible] [illegible];

② [illegible]

0.1mL [illegible]

0.01mL



[illegible]

[illegible]

[illegible]

2 [illegible]

[illegible] : [illegible]

[illegible]

[illegible]

[illegible] 0 [illegible] 0.01mL [illegible] 0 [illegible]

[illegible]

[illegible]

[illegible]

[illegible] : [illegible]

[illegible]

3 [illegible]

[illegible]

(1) [illegible] pH [illegible]

(2) [illegible] pH [illegible] pH [illegible]

[illegible]

[illegible] (pH5.0 [illegible] 8.0) [illegible]

□□□□

□□□□□□□□□□□□ pH □□□□□□□□□□

□□□□□□□ pH □□□□□□□□□□□□□□□

□□□□□□

□ 20.00mL 0.1000mol/L HCl □□ 20.00mL
0.1000 mol/L

NaOH □□□□□□□□□□□□□□□□□ 0.04 mL □

HCl □□□□□□□ pH □ 4 □ 10 □□□□□□□□□□□

□□□□□□□□□□□

4 [illegible]

[illegible] 1 [illegible]

① [illegible]

② [illegible] 2 [illegible]
3 [illegible] : [illegible] 3 [illegible] 5 mL [illegible]
[illegible]
[illegible]

③ [illegible] 0 [illegible] 2
[illegible] 3 mL [illegible]

④ [illegible]：[illegible] 0 [illegible]

0 [illegible]

⑤ [illegible] **2-3** [illegible]

[illegible] **2** [illegible]

[illegible]

[illegible] **3** [illegible] **2-3** [illegible] **p49** [illegible]

[illegible] **NaOH** [illegible]

[illegible]

[illegible]

____[illegible]____[illegible]____[illegible]

[illegible] ____[illegible] **20.00mL** [illegible] **NaOH** [illegible]

____[illegible]____[illegible]____[illegible]

[illegible] ① [illegible]____

____[illegible]____[illegible]____

[illegible]____[illegible]____[illegible]____

[illegible]

[illegible]

[illegible]

② [illegible]

[illegible]

[illegible] ____ [illegible] ____

[illegible]

③ [illegible]

[illegible] ____ [illegible] ____

mL **0.01**

[illegible]

[illegible]

$$C(\text{[illegible]}) = \frac{C(\text{[illegible]}) \times V}{(\text{[illegible]})\ V(\text{[illegible]})}$$

[illegible]

[illegible]

[illegible]

[illegible]: C([illegible]) [illegible] V([illegible]) [illegible] C([illegible]) [illegible] <u>V([illegible]) — [illegible].</u>

5 [illegible]

(1) [illegible]

(2) [illegible]

(3) [illegible]

(4) [illegible]

(5) [illegible]

(6) [illegible]

(7) [illegible]

(8) [illegible]

(9) [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

(10) [illegible] [illegible]

(11) [illegible] [illegible]

(12) [illegible]
[illegible] [illegible]

(13) [illegible] [illegible]

(14) [illegible] [illegible]

(15) [illegible] [illegible]

[illegible]

[illegible]

1. [illegible]

($K_2C_2O_4$) [illegible]

2. [illegible] **I^-** [illegible]

[illegible] **CrO_4^{2-}** [illegible] **$Cr_2O_7^{2-}$** [illegible] **H_2O_2** [illegible]

$KMnO_4$ [illegible] **IO_3^-** [illegible] **Cu^{2+}** [illegible] **NO_3^-** [illegible] **NO_2^-** [illegible] **I^-**

[illegible] **$Na_2S_2O_3$** [illegible]

[illegible] **$Cr_2O_7^{2-} + 6I^- + 14H^+ = 2Cr^{3+} + 3I_2 + 7H_2O$**

$I_2 + 2\,S_2O_3^{2-} = 2\,I^- + S_4O_6^{2-}$

[illegible] 1 [illegible] $(K_2C_2O_4)$ [illegible]

[illegible]

$5C_2O_4^{2-} + 2MnO_4^{-} + 16H^{+} == 10CO_2\uparrow + 2Mn^{2+} + 8H_2O$ [illegible] 0.1200mol/L [illegible] $K_2C_2O_4$ [illegible] 20.00mL [illegible] $KMnO_4$ [illegible] $KMnO_4$ [illegible] 19.92 mL [illegible]

[illegible]

[illegible] 1 [illegible] ____ [illegible]

[illegible] 2 [illegible] ________ [illegible]

[illegible]

[illegible] 3 [illegible] ________________

[illegible]

____

0.04819mol/L

[illegible] 4 [illegible] $KMnO_4$ [illegible] ______________ [illegible] 4 [illegible]

□2. □□□□□□□□□□□□□□□□□□□□□□□□□□(□□□□□□□□□□
KIO_3)□

□□□ I_2 □ $2S_2O_3^{2-}$□ 2 I^-□ $S_4O_6^{2-}$□□□□□□

A □□□□□ w g □□□□□□□□□□□□□□□□□

B □□□□□□□□□□□□□□□□□ KI □□□□ KIO_3 □ KI □□□□□

C □□□□□□□□□□□□□□□□□□□□□ 2.000×

10^{-3}mol/L □ $Na_2S_2O_3$ □□ 15.00 mL □□□□□□□□

□1□□□□□□□□□____1____ KIO_3 □____5____ KI □____3____ H_2SO_4 □

____3____ K_2SO_4 □____3____ I_2 □____3____ H_2O

□2□□□c□□□□□□□□□□□□□(□□□□)□□□□□□□□□□□ Na_2S_2O

□□□□□□□□____□□□____□□□□□□□□□□□□□□ □ □ □

$\frac{635}{w}$

[illegible] 3 [illegible]______ mg/kg [illegible] ([illegible] w [illegible])

[illegible] 4 [illegible] $2H^+ + S_2O_3^{2-} = S\downarrow + SO_2\uparrow + H_2O$ [illegible]

[illegible] c [illegible]______ [illegible] NaOH [illegible]

[illegible]

______ [illegible]______ ([illegible]“[illegible]”[illegible] “[illegible]”[illegible]“[illegible]”)

[illegible]